

REMARKS/ARGUMENTS

The Office Action mailed on November 28, 2003 has been reviewed and carefully considered. Claims 8-10 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 2, 5, 6, and 11 were rejected under 35 USC 103(a) as being unpatentable over Murphy, U.S. Patent Application Publication No. 2002/0112068 A1. Claims 3, 4, 12, and 13 were rejected under 35 USC 103(a) as being unpatentable over Murphy in view of Fussgager, U.S. Patent No. 5,050,952. Claim 7 was rejected under 35 USC 103(a) as being unpatentable over Murphy in view of Kragl, U.S. Patent No. 5,475,519. Claims 1-13 have been amended. Claims 1-13 are pending in this application, with claim 1 being the only independent claim. Reconsideration and withdrawal of the aforementioned rejections are respectfully requested.

Before discussing the cited prior art and the Examiner's rejections of the claims in view of that art, it would be appropriate to present a brief summary of applicant's claimed invention. As indicated in the preamble to claim 1 (lines 1-3 of amended claim 1), the present invention enables bi-directional optical communication between a central unit and a remote unit. Illustratively, the central unit may be utilized at a telecommunications service provider, whereas the remote unit may be utilized by a client subscriber of the telecommunications service provider. Communication is enabled with knowledge that the remote unit operates in a given communication mode selected from among a plurality of possible communication modes with which the central unit can operate. However, initially the central unit does not have knowledge of which communication mode is used by the remote unit. The communication modes that can possibly be used by the remote unit include simultaneous communication modes, such as simplex, full-duplex, and duplex, as well as alternating communication modes, such as half-duplex and part-duplex.

Prior to setting up communication between the central unit and the remote unit, the central unit must determine the communication mode used by the remote unit. This determination process is based upon a recognition that only one respective frame pattern, illustratively selected from a set of frame pattern variants having the same header cell as the one frame pattern, is compatible with each of a plurality of corresponding communication modes, such as simplex, full-duplex, half-duplex, diplex, part-diplex, and wavelength division multiplexed (WDM). By sending a sequence of defined frame patterns from the central unit, and then receiving a coherent response from the remote unit in response to one of the defined frame patterns, the central unit is able to identify the communication mode used by the remote unit as that which gave rise to the coherent response.

A. Claim Rejections Under 35 USC 112

With respect to claims 8-10, the Examiner stated that the limitation "the down frame" lacks antecedent basis. Claims 8-10 depend, either directly or indirectly, from claim 6. Accordingly, the phrase in claim 6 setting forth "a frame including an interruption" has been amended to read a down frame including an interruption", so as to provide proper antecedent basis for the phrase "down frame" in claims 8-10. It is submitted that claims 8-10 now meet all applicable requirements of 35 USC 112.

In reviewing the claims, it was noted that all claims included a superfluous "/" character immediately following the claim number. Claims 1-13 have been amended to delete this superfluous character.

B. Claims 1, 2, 5, 6, and 11 are patentable over Murphy

The Examiner contends that, under 35 USC 103(a), claims 1, 2, 5, 6, and 11 are unpatentable over Murphy (U.S. Patent Application Publication No. 2002/0112068 A1). More specifically, the Examiner argues that FIGs. 3 and 4 of Murphy disclose the claimed invention except for describing the invention in terms of a central unit and a remote unit. The Examiner reasons that it would have been obvious to one skilled in the art to use Murphy's frame detection mechanism in any number of LAN configurations, including a central/remote node configuration.

The problem addressed by Murphy is to recognize different frame patterns which are exchanged on the network when a new terminal is inserted into the network, in order to use only frame patterns which are present on the network. Murphy accomplishes this objective by monitoring frames which are exchanged on a network, such as a LAN. From the monitored frames, a type of captured frame pattern is adopted for communication. By contrast, the claimed invention establishes communication between a central unit and a remote unit through a sequential transmission of predefined frame patterns. Murphy neither teaches nor suggests a sequential transmission of predefined frame patterns.

In the present invention, when the central unit sends a sequence of defined frame patterns to the remote unit, and then receives a coherent response from the remote unit in response to one of the defined frame patterns, the central unit is able to identify the corresponding communication mode used by the remote unit. Murphy neither discloses nor suggests such functionality. Instead, Murphy monitors frames received from various devices on a LAN. From the monitored frames, a type of captured frame pattern is adopted for communication on the LAN.

Yet another factor serves to distinguish applicant's claimed invention from the teachings of Murphy. With reference to FIG. 1 of Murphy, the techniques disclosed therein operate in the data

link layer (blocks 110, 130 and 180). Murphy's process of data encapsulation does not concern the physical layer. By contrast, applicant's claimed invention operates in the physical layer (shown as block 105 in FIG. 1 of Murphy). In general, the data link layer refers to a special set of rules implemented by a program that handles moving data in and out across a physical link in a network. By way of comparison, the physical layer supports an electrical or mechanical interface to a physical medium. The physical layer determines the manner in which a stream of bits received from the data link layer is to be placed on an electrical connector, optical fiber transmitter, radio carrier, or other data transmission medium. Applicant's claimed method operates in the physical layer, in the sense that it sequentially places each of a plurality of predefined frame patterns on an optical data transmission medium. Murphy can only operate in the context of a preexisting physical layer protocol, the details of which are not disclosed in Murphy. Applicant's claimed invention proposes one possible solution for setting up physical layer communication. Accordingly, the techniques of Murphy could be implemented by utilizing applicant's claimed invention. To analogize, Murphy relates to the housing of information in a shipping container (i.e., data encapsulation performed in the data link layer), whereas the claimed invention is analogous to loading a container ship and routing the container ship from harbor to harbor (i.e., transmitting a sequence of frames on an optical data transmission medium).

To summarize, applicant's invention as set forth in claim 1 is not obvious in view of Murphy because Murphy neither suggests nor teaches a sequential transmission of predefined frame patterns. Moreover, the techniques of Murphy operate in the data link layer whereas the claimed invention operates in the physical layer.

Since claim 2 depends from independent claim 1, it is submitted that claim 2 is not obvious in view of Murphy for the reasons discussed above in connection with claim 1.

Since claims 5 and 6 depend indirectly from independent claim 1, it is submitted that these dependent claims are not obvious in view of Murphy for the reasons discussed above in connection with claim 1. Moreover, with respect to claims 5 and 6, the Examiner argues that it would have been obvious to use the techniques of Murphy to choose "to either interrupt or not interrupt frames since there is a wait period for recognition and acknowledgment of all frame types where the wait period is up to two seconds which is considered a long enough time to complete (sic) receive a frame without interruption". The interruption of transmission and lapse of time during this interruption as set forth in claims 5 and 6 is completely distinguishable from the two-second waiting period disclosed in Murphy. Murphy's two-second wait functions merely as an arbitrarily-determined latency period. By contrast, the interval of elapsed time in applicant's claimed approach, as set forth in claims 5 and 6, is to take into account propagation time and repolarization of a half-duplex component. In practice, this interval of elapsed time is on the order of a few microseconds, far short of Murphy's two-second latency period. The length of Murphy's waiting period evidences the fact that this period has nothing whatsoever to do with propagation delay compensation. Thus, claims 5 and 6 are not obvious in view of Murphy.

Since claim 11 depends indirectly from independent claim 1, it is submitted that claim 11 is not obvious in view of Murphy for the reasons discussed above in connection with claim 1. Moreover, with respect to claim 11, the Examiner argues that Murphy discloses a frame header cell that "includes a special field specifying the frame pattern used (FIG. 2, #260, page/paragraph 3/0034)". A review of the referenced figure and text reveals that reference numeral 260 refers to a "packet type identifier 260" that "identifies the type of packet". However, no mention is made of the "packet type identifier 260" specifying the frame pattern used. Thus, claim 11 is not obvious in view of Murphy.

C. Claims 3, 4, 12, and 13 are patentable over Murphy in view of Fussgager

The Examiner contends that, under 35 USC 103(a), claims 3, 4, 12, and 13 are unpatentable over Murphy in view of Fussgager, U.S. Patent No. 5,050,952. Regarding claims 3 and 4, the Examiner alleges that the combination of Murphy and Fussgager discloses applicant's claimed invention "wherein the communication modes comprise duplex, and duplex modes". In reaching this conclusion, the Examiner reasons that Fussgager's use of the term "duplex" (Fussgager, col. 2, lines 5-10) is understood to cover all variants of duplex transmission. Regarding claims 12 and 13, the Examiner states that Murphy does not disclose "wherein the remote units are distinguished by wavelength, and the step of sending the plurality of frame patterns sequentially is performed in succession at each remote unit wavelength for each frame pattern until a coherent response is obtained". The Examiner alleges that Fussgager discloses transmission between stations over multiple wavelengths, and reasons that it would have been obvious to one of ordinary skill in the art to use the Murphy frame detection scheme over a multi-wavelength system.

The teachings of Murphy have been described above in connection with the Examiner's obviousness rejection of claim 1. Fussgager discloses an optical communication system for diplex or duplex transmission. Two signals are transmitted with different fiber modes at two different wavelengths, either unidirectionally or bidirectionally, via a single waveguide. If one of the two wavelengths is above the cutoff wavelength of a coupler waveguide, and the other wavelength is below the cutoff wavelength of a coupler waveguide, fusion couplers with exactly similar fibers are used as multiplexers, demultiplexers, and duplexers. If both wavelengths are below the cutoff

wavelength of the coupler waveguide, fusion couplers with dissimilar fibers are used as multiplexers, demultiplexers, and duplexers.

Even if the teachings of Fussgager and Murphy are combined, the resulting combination fails to meet the claimed invention as set forth in claims 3, 4, 12, and 13. Claims 3, 4, 12, and 13 depend indirectly from claim 1. Line 6 of amended claim 1 calls for a sequential transmission of predefined frame patterns. Neither Fussgager nor Murphy suggest a sequential transmission of predefined frame patterns. Accordingly, claims 3, 4, 12 and 13 are not obvious in view of the combination of Fussgager and Murphy.

D. Claim 7 is patentable over Murphy in view of Kragl

Claim 7 was rejected under 35 USC 103(a) as being unpatentable over Murphy in view of Kragl, U.S. Patent No. 5,475,519. The Examiner observes that Murphy does not disclose a reflection modulator, and then cites Kragl to supply this missing element. Murphy was discussed above in connection with the Examiner's obviousness rejection of claim 1. Kragl discloses an integrated-optical circuit for modulating and reflecting incoming optical signals. The circuit includes a Bragg resonator coupled to a photocell and a light guide. This configuration permits optical signals to be received and transmitted without requiring active transmission elements such as a laser.

Even if the teachings of Murphy and Kragl are combined, the resulting combination fails to meet the claimed invention as set forth in claim 7. Claim 7 depends indirectly from claim 1. Line 6 of amended claim 1 calls for a sequential transmission of predefined frame patterns. Neither Kragl nor Murphy suggest a sequential transmission of predefined frame patterns. Accordingly, claim 7 is not obvious in view of the combination of Kragl and Murphy.

E. Summary

Based on the foregoing considerations, it is respectfully submitted that the present invention as set forth in claims 1-13 is clearly and patentably distinguishable over the applied references. Accordingly, prompt and favorable action leading to allowance of the present application is respectfully solicited.

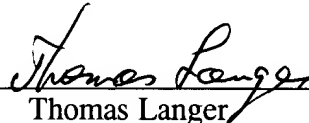
Should the Examiner have any comments, questions, suggestions or objections, he is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

If any additional fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

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